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Subject: Impact of budget cuts on faculty members of UPRM

I. Introduction

The following pages present a quantitative analysis on the above subject. The calculations produced by the authors are based on data available at the time it was written, i.e., by the middle of June of the current year. We assume that the budget cut to the Mayagüez Campus of the University of Puerto Rico (UPRM) can reach \$47 million. This budget reduction is largely based on the arbitrary determination by the Financial Oversight and Management Board for Puerto Rico to the Legislative Assembly, which orders a "saving" of \$204 million to the UPR. In spite of lacking the precise information on how much will finally be the cut to the UPRM, we assume that it follows the historical proportion that represents the enclosure of the total budgeted for the UPR system. Also, data on the number of courses and sections for the recently completed academic year 2016-2017 are not available at this time. Thus, we use the enrollment data (an average of 13,073 students for the last year) and the number of teachers (862 full time and 41 part time).

II. Analysis of the academic load during the period 2012 to 2016

The table below details the number of professors in each of the four UPRM faculties and those assigned to the Dean of Academic Affairs (AA) and to "others", the latter being a category which includes other teaching activities. In the case of Business Administration (ADEM) the number is reduced, from 46 to 41 during the period, but in the rest of the schools the number does not vary substantially. In the case of Agricultural Sciences (CA) there is an increase of 5 in the teaching staff. Consequently, the total number

of the teaching staff increases by only 2: from 738 for the academic year 2012-2013 to 740 for the

academic year 2015-2016.

NUMBER OF PROFESSORS

School	2012-13	2013-14	2014-15	2015-16
Business Administration	46	46	43	41
Arts and Sciences	366	368	367	367
Engineering	180	177	173	178
Agricultural Science	29	29	24	34
Academic Affairs (AA)	15	15	17	18
OTHERS	102	102	86	102
	738	737	710	740
Four Schools	621	620	607	620
AA + Others	117	117	103	120

Source: Oficina de Investigación Institucional y Planificación. <http://www.uprm.edu/p/oiip/perfiles>

A glance at the workload of UPRM professors during the four years indicated reveals, according to the table below, that the number of credits per teacher decreased very little in the case of the ADEM College, but increased by 6.28% for Arts and Sciences (AC), by 0.54% for Engineering (INGE), by 7.04% for CA, 32.74% for AA, and 23.97% for "Others". This represents an increase of 6.7% in the median and almost 12% in the average workload of UPRM professors. The same pattern is observed in the number of sections per professor and in the number of students per professor. Avoiding details by academic schools, there is a median increase for the whole campus of 9.1% and an 8.6% increase in the average of sections per professor. There was also a 13% increase in the median and an 18.9% rise in the average number of students per professor. In other words, during the past four academic years, not counting the current year, the three variables that are typically used to quantify the work of teachers reveal beyond doubt an increase in the workload responsibility of this professional class. It should not be forgotten that this has occurred in an environment of wage freeze and reduction or elimination of benefits, which has precariously affected the work situation and, consequently, reduced the purchasing power of the UPRM teaching staff.

Data: Academic Years 2012-13 to 2015-16

School:	Professors	Credit/ Professor	Section/ Professor	Students/ Professor
	Growth Rate			
Business Administration	-10.9%	-0.29%	3.9%	12.0%
Arts and Sciences	0.3%	6.28%	-3.7%	-0.4%
Engineering	-1.1%	0.54%	0.7%	0.5%
Agricultural Sciences	17.2%	7.04%	14.4%	38.0%
Academic Affairs	20.0%	32.74%	22.0%	49.1%
OTHERS	0.0%	23.97%	14.2%	14.0%
Median	0.1%	6.7%	9.1%	13.0%
Simple Average	4.3%	11.7%	8.6%	18.9%
Rate				
Median		67.00	91.00	130.00
Simple Average		2.72	2.00	4.40

Source: Oficina de Investigación Institucional y Planificación. <http://www.uprm.edu/p/oiip/perfiles>. Calculations from the authors

If the previous analysis weights the statistics of academic colleges based on the number of teachers per unit as a proportion of the total teaching staff of the UPRM, the results would be as presented in the following table. It should be noted that, even though weighting the annual average statistically, the workload increases by 7.5% in the case of credits per teacher; 1.5% in sections per teacher; and 5.1% in students per teacher.

Academic Years 2012-13 to 2015-16	Weighted yearly growth rate			
	Professors	Credit/ Professor	Sections/ Professor	Students/ Professor
Business Administration	-0.678%	-0.018%	0.246%	0.748%
Arts and Sciences	0.136%	3.117%	-1.857%	-0.189%
Engineering	-0.271%	0.133%	0.177%	0.117%
Agricultural Sciences	0.678%	0.277%	0.566%	1.493%
Academic Affairs	0.407%	0.666%	0.447%	0.998%
OTHERS	0.000%	3.313%	1.968%	1.930%
Average yearly growth rate	0.271%	7.487%	1.546%	5.097%
Rate		2762.7%	20.7%	329.6%

Source: Oficina de Investigación Institucional y Planificación. <http://www.uprm.edu/p/oiip/perfiles>. Calculations from the authors

Data in the following table reveals that over the past academic year the UPRM faculty offered 7,361 credits in 3,047 sections, or a "clientele" of 58,782 students. These figures provide an idea of the magnitude of

the work done by the UPRM teaching faculty and will be compared with the figures for the academic year

2016-2017, once official statistics are available.

Total number of Credits, Sections and Students			
Academic Year 2015-16	Credits	Sections	Students
Business Administration	424	162	3,422
Arts and Sciences	4,593	1,604	35,520
Engineering	1,643	742	10,449
Agricultural Sciences	305	154	2,309
Academic Affairs	27	33	756
OTHERS	369	352	6,326
Sub-total	7,361	3,047	58,782

Source: Oficina de Investigación Institucional y Planificación. <http://www.uprm.edu/p/oiip/perfiles>. Calculation from the authors

III. Scenario resulting from reduction in UPRM budget

Now we simulate the scenario of an increase in the workload of the UPRM professors, once the institution's reduced budget begins on July 1st. If we use as a reference the 2017-18 Budget of Puerto Rico (which could coincide with the budget imposed by the Financial Oversight and Management Board), and the allocation of funds to the UPR, we have a decline in operating costs of about 165.4 million dollars, or a 13.3% reduction¹. In the case of UPRM, the reduction would be \$47 million, equivalent to a 17.2%. Interestingly, Aguadilla and Carolina do not suffer drops in operating expenses.

Refer to the following table:

¹ Note that the budget reduction for the whole UPR system, as approved by the Oversight and Management Board, is \$204 million. However, the final version of the budget suggests an additional funding of \$40 million. Therefore, the net decrease would be \$160 million, a figure very close to the one employed in this report. The additional \$40 million will not be assigned to academic affairs, but to capital improvements, personnel training and other operational expenses.

Operational Expenditures (000 \$)	2015 Expended	2016 Expended	2017 Appropriation	2018 Recommended	2018-17 Change	2018-17 % Total	2018-17 Cumulative %
Río Piedras	292,041	291,549	308,510	247,369	-61,141	37%	37%
Mayagüez	264,961	267,520	274,789	227,597	-47,192	29%	65%
Medical Sciences	311,037	289,840	296,677	258,642	-38,035	23%	88%
Aguadilla	40,011	39,189	36,367	38,085	1,718	-1%	87%
Arecibo	52,160	51,422	50,421	45,803	-4,618	3%	90%
Bayamón	57,796	59,853	53,699	51,958	-1,741	1%	91%
Carolina	48,816	45,103	42,651	43,392	741	0%	91%
Cayey	58,079	51,598	50,532	48,987	-1,545	1%	92%
Humacao	63,611	62,544	63,893	55,063	-8,830	5%	97%
Ponce	41,309	42,379	40,489	37,909	-2,580	2%	99%
Utuado	21,714	21,978	21,482	19,282	-2,200	1%	100%
Sub-total	1,251,535	1,222,975	1,239,510	1,074,087	-165,423	100%	
Total Budget UPR	1,377,732	1,377,449	1,383,966	1,270,276	-113,690		

Source: Office of Budget and Management, Puerto Rico

The number of UPRM full time professors (862) and part time (41) are shown in the following table, for a total of 903, according to official UPR information for academic year 2016-17. Data from the other campuses are also presented for comparison purposes.

UNITS	Total, Professors			Full Time professors			Temporary professors		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Aguadilla	162	84	78	113	54	59	49	30	19
Arecibo	212	103	109	175	82	93	37	21	16
Bayamón	261	119	142	205	96	109	56	23	33
Carolina	221	133	88	105	59	46	116	74	42
Cayey	202	100	102	122	67	55	80	33	47
Medical Sciences	1,090	487	603	706	272	434	384	215	169
Humacao	287	126	161	184	87	97	103	39	64
Mayagüez	903	536	367	862	514	348	41	22	19
Ponce	193	84	109	103	43	60	90	41	49
Río Piedras	1,090	547	543	916	466	450	174	81	93
Utuado	88	48	40	66	35	31	22	13	9

Source: Consejo de Educación Superior.

<https://www.dropbox.com/s/thvemm9qdati8fy/Databook%20%20CEPR%20Superior%202015%202016%20octubre%202016.xlsx?dl=0>

Payroll for the past academic year (2015-16) was \$ 54,180,000. If this figure is divided by the total number of teachers (903, divided between 862 full time and 41 part time), the average salary per teacher would be \$ 60,000. The table below shows that the UPRM paid a payroll of \$167,812,000, so that faculty's salaries represented 32.3% of total payroll. This ratio could increase, depending on the inclusion of marginal benefits and other allocations.

Professors UPRM 2015-16	
Full Time	862
Part time	41
Total	903
Average Salary	\$60,000.00
Professors' Payroll	\$54,180,000
Total Payroll	\$167,812,000
Professors' Payroll/ Total Payroll	32.3%

Source: Oficina de Investigación Institucional y Planificación. <http://www.uprm.edu/p/oiip/perfiles>. Calculation from the authors

It is noted that the cut in payroll of the UPRM will be \$ 30.1 million for the next academic year. The following table shows the impact of the decline (column entitled "Change") for each item of expenditure. These figures confirm that the total reduction in the UPRM budget would be little more than \$ 47 million.

Operational Expenditures (000 \$)	2015	2016	2017	2018	2018-17	2018-	Cumulative %
						17	
Payroll and marginal benefits	174,147	167,812	170,818	140,707	-30,111	64.1%	64.1%
Facilities and Payments to Public Services	10,427	7,780	10,454	7,155	-3,299	7.0%	71.1%
Services Purchased	4,301	3,170	4,340	3,428	-912	1.9%	73.0%
Donations, Subsidies and Distributions	44,776	45,923	42,488	44,987	2,499	-5.3%	67.7%
Transportation Expenditures	2,540	3,199	3,026	2,276	-750	1.6%	69.3%
Other Operational Expenses	8,455	23,573	21,953	18,340	-3,613	7.7%	77.0%
Equipment Purchases	8,802	2,242	5,395	1,950	-3,445	7.3%	84.3%
Material and Supplies	11,479	13,785	16,080	8,721	-7,359	15.7%	100.0%
Media and Social Promotion	34	36	54	33	-21	0.0%	100.0%
					-47,011		100.0%

Source: Office of Budget and Management, Puerto Rico

If 32.3% of the budget decline corresponds to teachers' salaries, then we can expect that the employment impact of UPRM professors will be a reduction of 155 full-time and 7 part-time professors. The total would be 162 fewer educators, equivalent to 17.9% of the total number of current professors.

Refer to the following table.

Total Payroll Cut	\$30,111,000.00	
Professors' Payroll Cut	\$9,721,677	
Cut in Number of Professors	% total	
Full Time	155	18.0%
Part Time	7	17.1%
Reduction of Professors	162	17.9%

Source: calculation from the authors. See previous tables.

Even assuming that the number of teachers dismissed or whose contracts are not renewed for the next academic year (beginning in August 2017) is 150 (that is, we reduced from 162 to 150 the figure calculated in the previous table), the impact in terms of the decline of positions or jobs per academic college would be as shown in the following table. Based on the data we used at the beginning of this report, jobs would be reduced to 590 teaching positions. Using the figure of 903 positions suggested by the official source for academic year 2015-2016, the number of teaching positions would drop to 753.

	2015-16		Simulation:
	Historic	Change	Assuming a Cut of approximately 150 positions
Business Administration	41	-9	32
Arts and Sciences	367	-74	293
Engineering	178	-37	141
Agricultural Sciences	34	-6	28
Academic Affairs	18	-3	15
OTHERS	102	-21	81
Sub-total	740	-150	590
Four schools	620	-126	
AA + Others	120	-24	

Source: calculation from the authors. See previous tables.

If we calculate the impact of this drastic reduction in the number of professors on the three variables analyzed at the beginning of this report for the previous four academic years, the increase in the

workload for the UPRM teaching staff would be as reflected in the following tables. The first table suggests that the median of credits per professor rises from 9.1 to 11.23, which means a 23.46% increase in workload. In average, the increase would be from 7.69 credits per professor to 9.65, or a 25.41% growth in workload. The second table shows an increase in the load of sections per teacher of almost 25%, whether we use the median or the average. In practice this would result in one additional section of three credits per semester per professor, receiving the same salary as currently, which is equivalent to 25% increase in work to be done, assuming that the load per semester is twelve credits, or four sections of three credits each. Finally, the third table reveals that the number of students per professor would also increase between 24% and 25% (median and average respectively), which confirms the trends of the two previous variables.

In short, the budget “saving” for the UPRM, as projected in the budget of the UPR for the next fiscal year, would have a substantial impact on the workload of the campus teaching staff, as a consequence of the drastic reduction in payroll. Such a reduction would imply that, as a minimum, 150, and as a maximum, 162 fewer professors would be working in the institution and that the remaining teaching staff would carry out the same work performed by many more teachers in previous academic years, though attending the same number of courses, sections and students. In short, it will be a labor scenario with fewer teachers, but with the same amount of students as in previous academic years.

Credits/Professor

Colleges	2015-16	Year impact	Change in Credits per Professor	Growth Rate
Business Administration	10.33	13.38	3.05	29.54%
Arts and Sciences	12.52	15.70	3.18	25.42%
Engineering	9.23	11.62	2.39	25.87%
Agricultural Sciences	8.97	10.85	1.88	20.97%
Academic Affairs	1.50	1.81	0.31	20.39%
OTHERS	3.62	4.54	0.92	25.51%
Median	9.10	11.23	2.13	23.46%
Average	7.69	9.65	1.96	25.41%

Sections/Professor

	2015-16	Year impact	Change in Sections per Professor	Growth Rate
Business Administration	3.95	5.12	1.17	29.54%
Arts and Sciences	4.37	5.48	1.11	25.42%
Engineering	4.17	5.25	1.08	25.87%
Agricultural Sciences	4.53	5.48	0.95	20.97%
Academic Affairs	1.83	2.20	0.37	20.39%
OTHERS	3.45	4.33	0.88	25.51%
Median	4.06	5.18	1.01	24.99%
Average	3.72	4.64	0.93	24.93%

Students/Professor

	2015-16	Year impact	Change in Students per Professor	Growth Rate
Business Administration	83.46	108.11	24.65	22.80%
Arts and Sciences	96.79	121.39	24.61	25.42%
Engineering	58.70	73.89	15.19	25.87%
Agricultural Sciences	67.91	82.15	14.24	20.97%
Academic Affairs	42.00	50.56	8.56	20.39%
OTHERS	62.02	77.84	15.82	25.51%
Median	64.97	99.63	15.50	23.86%
Average	68.48	85.66	17.18	25.09%

IV. Conclusions

The analysis conducted in the previous pages allows us to reach the following conclusions:

1. During the past four academic years, not counting the current year, the three variables that are typically used to quantify the professors' workload reveal beyond doubt an increase in the responsibility of this professional class. **It should not be forgotten that this has occurred in an environment of wage freeze and reduction or elimination of benefits, which has precariously affected the labor situation and reduced the purchasing power of the UPRM teaching staff.**
2. If 32.3% of the budget reduction for the UPRM corresponds to professors' salaries (approximately \$ 9.7 million less in payroll), then we can expect that the employment impact of the UPRM professors will be reduced by 155 full-time professors and 7 part-time. Total drop would be 162 fewer educators, equivalent to 17.9% of total current professors. Because the number of students at the UPRM will remain at about 13,000 during the next academic year, this will result in a drastic increase in the workload of each faculty member of the institution. Based on the data employed at the beginning of this report, jobs would be reduced to 590 teaching positions. Using the figure of 903 positions suggested by data for academic year 2015-2016, the number of positions would be reduced to 753.
3. In other words, the budget reduction would imply that the teaching staff remaining in the UPRM would carry out the same work as in previous academic years, attending to the same number of courses, sections and students with fewer personnel².
4. The net impact of all of the above is that each professor would increase their workload by approximately 25% in each academic semester, receiving the same pay (\$ 60,000 annually on average). Consequently, **the effect of the budget reduction is that, by performing 25% of additional tasks for the same pay, the adjusted salary of each member of the teaching staff**

² The RUM's Office of Admissions has already certified that the number of freshmen (first year enrollment) for academic year 2017-2018 has exceeded by 2% the amount of new-comers projected by the institution. This means that total enrollment by August 2017 (total demand for academic services) will surpass by 2% the projected academic offerings (total academic supply).

In allocating the average non-received payment of \$15,000 per professor (to teachers who would remain working in the UPRM), the impairment of incomes not received would be at least \$8.85 million per year if 590 professors remain employed and, at the most, of \$11.3 million per year, if 753 professors remain.

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